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DISAPPROVAL OF THE OU #5 DRAFT FEASIBILITY STUDY REPORT AND PROPOSED PLAN

01/31/95

USEPA DOE-FN
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COMMENTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JAN 31 1995

Mr. Jack R. Craig
United States Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

HRE-8J

RE: Disapproval of the OU #5
Draft Feasibility Study
Report and Proposed Plan

Dear Mr. Craig:

The United States Environmental Protection Agency (U.S. EPA) completed its review of the Operable Unit (OU) #5 Draft Feasibility Study (FS) Report and Proposed Plan (PP). The FS report considers four land use objectives and conducts detailed analysis of seven alternatives. Also, actions in this OU impact all other OU's. Although the documents follow U.S. EPA guidance, there are many areas of concern. As a result, U.S. EPA has generated numerous comments on the document, specifically, in the areas of evaluating and screening remedial alternatives, groundwater modeling, risk assessment, and waste acceptance criteria for the proposed disposal cell.

U.S. EPA hereby disapproves the FS and PP reports pending incorporation of the attached comments. The United States Department of Energy (U.S. DOE) must provide responses to the attached comments and revised pages within thirty (30) days receipt of this letter. Considering that these documents are primary document as defined in the 1991 Amended Consent Agreement, U.S. EPA recommends a meeting to discuss the outstanding issues/comments as soon as possible.

Per discussions with the Ohio Environmental Protection Agency and members of the Fernald Citizens Task Force U.S. EPA also recommends U.S. DOE further evaluate treatment options for waste that may be placed in the disposal cell to promote further groundwater protection, despite the waste meeting the waste acceptance criteria.

Please contact me at (312) 886-0992 if you have any questions regarding this matter.

Sincerely,

James A. Saric, Remedial Project Manager
Technical Enforcement Section #1
RCRA Enforcement Branch

cc: Tom Schneider, OEPA-SWDO
Jack Baublitz, U.S. DOE-HDQ
Don Ofte, FERMCO
Jim Theising, FERMCO
Paul Clay, FERMCO

TECHNICAL REVIEW COMMENTS ON THE DRAFT OPERABLE UNIT 5 FEASIBILITY STUDY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (FEMP)

GENERAL COMMENTS

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.0 and 4.0 Page #: NA Line #: NA
Original General Comment #: 1
Comment: Section 2.6 presents a discussion of cross-media preliminary remediation goals (CPRG) for Operable Unit (OU) 5. Table 2-5 presents CPRGs for radionuclides and chemicals. Specific contaminant levels are presented for the protection of human health and the Great Miami Aquifer (GMA). Two different levels are presented for total uranium, one for uranium associated with a soil leaching coefficient of 15 liters per kilogram (L/kg) and one for uranium associated with a soil leaching coefficient of 325 L/kg. The CPRG for total uranium for soil with a leaching coefficient of 325 L/kg is 98 parts per million (ppm). In Section 4.0, alternatives are developed for nine risk cases. Alternatives 4A, 4B, 4C (all risk cases) propose preliminary remediation levels (PRL) of greater than 98 ppm uranium. It is unclear how Alternatives 4A, 4B, and 4C are protective of the GMA because the proposed PRL of 125 ppm uranium exceeds the CPRG of 98 ppm uranium. Either this discrepancy should be explained, or Alternatives 4A, 4B, and 4C should be eliminated because they are not effective in meeting the remedial action objectives (RAO).

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.0 Page #: NA Line #: NA
Original General Comment #: 2
Comment: Section 3.0 identifies and screens technology types and process options that may be applicable to OU 5. Table 3-9 summarizes the technologies and process options retained for soil and sediment remediation. Primary, support, and representative process options are listed for each technology type. Representative process options for the physical/chemical and solidification/stabilization technology types are not identified, and an explanation for not considering them is not provided. Because a treatability study was conducted for soil washing, more detail should be provided to explain why soil washing is not evaluated further in this feasibility study (FS). In addition, an explanation for why cementation is not considered should be provided. The reason for not considering cementation is particularly confusing because thermal desorption is retained. Both cementation and thermal desorption are proposed for the treatment of

Resource Conservation and Recovery Act (RCRA) inorganic and organic wastes, respectively.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.0 Page #: NA Line #: NA
Original General Comment #: 3
Comment: Section 4.0 presents waste acceptance criteria (WAC) for on-site disposal. The WAC for OU 5 should be compared to the WAC established for OU 2. Any differences in the OU 2 and OU 5 WACs should be explained.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.0 Page #: NA Line #: NA
Original General Comment #: 4
Comment: Section 4.0 discusses the development and screening of remedial alternatives. Usually, alternatives are assembled from combinations of technologies and associated process options previously evaluated; however in the OU 5 FS, none of the eight soil process options identified as potentially applicable and summarized in Table 3-9 are considered for incorporation into the remedial alternatives. Use of these treatment technologies to reduce the toxicity, mobility, or volume of contaminated soil before disposal is viable as discussed in Appendix L. The technologies therefore need to be evaluated and considered for incorporation into remedial alternatives unless additional support for their elimination is provided. The discussion in Section 4.1.1, Page 4-5, Lines 1-9, should be expanded, especially Item 1, which discusses very briefly the treatment of soil. In addition, conclusions about why each of the soil treatment technologies is or is not included in possible remedial alternatives as a support technology should be presented.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.0 Page #: NA Line #: NA
Original General Comment #: 5
Comment: Section 4.0 discusses the screening of alternatives. The C alternatives (2C, 3C, and 4C) each propose on-site disposal in a centralized consolidation area with an earthen cover. The text in Section 4.4.6, Page 4-110, Lines 8 - 11, states that the consolidation area with an earthen cover is only appropriate for risk cases that propose PRLs of less than 45 ppm of uranium; however, as indicated in Tables 4-18 and 4-19, Alternative 3C for Cases 5, 6, and 7 and Alternative 4C for Cases 8 and 9 propose PRLs of greater than 45 ppm of uranium. Despite this discrepancy, these alternatives are carried forward to the detailed analysis of alternatives presented in Section 5. Alternatives 3C (Cases 5, 6, and 7) and 4C (all risk cases) should be eliminated in Section 4.0 of the FS because they are not effective in achieving RAOs.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.3 Page #: 4-8 to 4-9 Line #: NA
Original General Comment #: 6
Comment: Section 4.1.3 is titled "Waste Acceptance Criteria." The section describes the WAC for on-site disposal but does not refer to the WAC for off-site disposal detailed in Appendix E. The text should be revised to clearly define and differentiate between the on-site and off-site WACs.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.3 Page #: NA Line #: NA
Original General Comment #: 7
Comment: The following discrepancies were found between the OU 5 FS and the Draft Proposed Plan: (1) in Table 4-10, the number of rail cars necessary for off-site disposal of soil under Cases 1 and 2 is not the same as the number presented in the Draft Proposed Plan; (2) in Table 4-13, the total project cost of Case 9 is not the same as the cost presented in the Draft Proposed Plan; and (3) in Table 4-18, the number of rail cars necessary for off-site disposal under Case 7 is not the same as the number presented in the Draft Proposed Plan. These discrepancies should be resolved and the text revised as necessary.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.3 Page #: NA Line #: NA
Original General Comment #: 8
Comment: Section 4.3 describes the alternatives that will undergo initial screening. Sections 4.3.3, 4.3.4, and 4.3.5 describe the A, B, and C alternatives, respectively. For each of these alternatives, the soil remediation summary states that soil contaminated with hazardous waste will be treated to meet the federal Land Disposal Restriction (LDR) levels for off-site disposal; however, for most of the A, B, and C alternatives, contaminated soil will not be treated to meet LDR levels. In most cases, soil containing hazardous waste will be treated to meet the on-site WAC and then be disposed of in the on-site disposal cell or consolidation area. This inconsistency in the text of Section 4.3 should be resolved.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.0 Page #: NA Line #: NA
Original General Comment #: 9
Comment: Section 5.0 presents the detailed analysis of alternatives. The evaluation of the C alternatives may need to be eliminated if the State of Ohio applies its solid waste regulations to the contaminated soil to be disposed of in the consolidation area. The text should be changed to reflect the applicable State of Ohio regulations for solid waste.

Commenting Organization: U.S. EPA Commentor: Saric
Sections #: 5.0 and 6.0 Page #: NA Line #: NA
Original General Comment #: 10
Comment: Generally, the detailed analysis of seven remedial alternatives presented in Section 5.0 and comparative analysis of these alternatives in Section 6.0 appear to be prepared in accordance with the U.S. EPA remedial investigation/feasibility study (RI/FS) guidance document; however, the assumptions used to estimate the risk budget and contingency percentages for each alternative are not explained. In addition, the rationale for applying the same risk budget and contingency percentages to both the construction cost and the operation and maintenance (O&M) cost is not clear because construction and O&M involve different risks. The text should be revised to provide the assumptions used to develop risk budgets and contingency percentages and the justification for applying the same percentages to both construction and O&M.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 7.0 Page #: NA Line #: NA
Original General Comment #: 11
Comment: This section should be revised to address all relevant comments provided by U.S. EPA for the Comprehensive Response Action Risk Evaluation (CRARE).

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.0 Pg. #: NA Line #: NA
Original General Comment #: 12
Comment: Section C.3.0 presents numerous equations for which terms are defined. As part of the definitions, the units for each of the terms are presented. Some of the terms have different units, depending on whether radionuclides or chemicals are being considered. In order to present the information clearly, Section C.3.0 should be revised to specify which units are associated with radionuclides and which are associated with chemicals. For example, the units for intake are routinely presented as "picoCuries (pCi) milligram per kilogram per day (mg/kg-d)." This presentation could be clarified as "(pCi, radionuclides) (mg/kg-d, chemicals)."

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.0 Page #: NA Line #: NA
Original General Comment #: 13
Comment: Section C.3.0 includes many example calculations. Frequently, the exponents of unit risks (UR) and intakes are incorrectly presented as negative rather than positive values. For example, the intake of uranium 238 through ingestion of contaminated fruits and vegetables is incorrectly presented as 7.31×10^{-5} pCi rather than as 7.31

x 10^5 pCi. Section C.3.0 should be closely reviewed and calculations checked and corrected as necessary.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: D Page #: NA Line #: NA
Original General Comment #: 14
Comment: The soil washing treatability studies conducted by IT Corporation and the Fernald Environmental Restoration Management Corporation (FERMCO) show that minimum contaminant removal of 90 percent can be achieved using a physical and chemical separation process. The chemical separation process uses a carbonate-based reagent as a primary extractant followed by a sulfuric acid-based reagent. No discussion of cost and the sensitivity of the cost to the volume of soil treated is presented. This discussion should be provided to determine the economic viability of soil washing in the mix of alternatives discussed in the OU 5 FS.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: E.6.0 Page #: E-6-2 and E-6-3 Line #: NA
Original General Comment #: 15
Comment: Table E.6-1 provides specific waste acceptance requirements for the Nevada Test Site and the representative permitted commercial facility. For bulk requirements, the table states that mixed waste must be packaged to be accepted at the Nevada Test Site. For marking requirements, the table states that mixed waste packages of 110 gallons or less shall be marked in accordance with 49 Code of Federal Regulations (CFR) 262.32(b); however, Table 3-8 and Section M.5.7.2 state that the Nevada Test Site will not accept mixed waste. This discrepancy should be resolved and the text revised accordingly.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1 Page #: NA Line #: NA
Original General Comment #: 16
The text in Section F.1.3 indicates that current and future residual contamination to be evaluated in the OU 5 FS does not include OU 3 soils or perched groundwater. It is not clear how and when these media will be addressed because the OU 3 RI only deals with contamination associated with production area structures and not with environmental media. The introductory sections of Appendix F should be revised to clearly indicate how and when contaminated OU 3 subsurface environmental media will be addressed.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1 Page #: NA Line #: NA
Original General Comment #: 17

The development of remedial actions for surface water is based on the assumption that all perched groundwater will be remediated and will not act as a source of surface water contamination. Unless the entire site is covered with an impermeable cap, the post-remediation development of contaminated perched water units having a lateral flow component cannot be ruled out as a source of surface water contamination. It is also likely that some contaminated perched water units have not been identified and therefore will not be remediated. These scenarios regarding future surface water contamination through the perched groundwater pathway should either be evaluated or their exclusion should be more fully justified.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1 Page #: NA Line #: NA
Original General Comment #: 18

The FS uses a source area size of 125 by 125 feet for CPRG development. A source area this large may not be adequate in areas where very high levels of contamination occur (such as production area soils). Justification for using this source area size for CPRG development in the production area should be provided.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1 Page #: NA Line #: NA
Original General Comment #: 19

It is not clear how the concept of source depletion through remediation or natural processes affects the retardation factor. The OU 5 RI states that once the contaminant concentration of the passing plume begins to decrease, adsorption stops and desorption becomes dominant. This statement implies that in most cases, contaminated subsurface soils are desorbing contaminants to the water percolating through the vadose zone. This conclusion in turn implies that at any point in time, contaminant concentrations at the bottom of Layer 2 should be higher than concentrations at the bottom of Layer 1. It is not clear, however, whether the ODAST/SWIFTLOAD model output will reflect this situation. The effects of contaminant desorption during vertical transport modeling should be further discussed.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6 Page #: NA Line #: NA
Original General Comment #: 20
Comment: The text cites equations in this section to perform calculations such as a water budget analysis for perched groundwater (see Section F.6.2.1.3). The text should either

include references or describe the derivation of the equations used.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.2.1.3 Page #: NA Line #: NA
Original General Comment #: 21
Comment: The text refers to an incremental lifetime cancer risk (ILCR) of 10^{-6} and Hazard Quotient (HQ) protective level of 0.2 for land use scenarios. For the OU 5 RI, a HQ of 0.1 was used for land use scenarios. The text should state why a HQ of 0.2 was used in the FS.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2 Page #: NA Line #: NA
Original General Comment #: 22
Comment: Section F.7.2 provides the modeling background. Information concerning contaminant loadings to the GMA is not provided for the various remediation scenarios. Information such as the rate and amount of contaminants moving from the glacial overburden to the GMA should be provided. This information should also be provided because remediation of sources such as the glacial overburden will not occur in a short period of time and will continue to load contaminants to the GMA.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.3 to 7.6 Page #: NA Line #: NA
Original General Comment #: 23
Comment: The text should provide information such as well depths, screened intervals, and radii of influence for extraction wells used in the different remedial scenarios. This information will aid in the analysis of the different remediation scenarios presented.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix G Page #: NA Line #: NA
Original General Comment #: 24
Comment: Section G.2.2.2.5 states that personal protective equipment (PPE) will be worn by workers (presumably on-site remediation workers) to reduce the potential for exposure through inhalation, dermal contact, and ingestion. Figure G.2-1 indicates that the inhalation exposure pathway (except for inhalation exposures associated with volatiles from groundwater treatment) is considered a complete exposure pathway and will be quantitatively evaluated. The ingestion and dermal exposure pathways are not evaluated because the use of PPE mitigates exposure from these pathways. Similarly, Table G.3-2 indicates that inhalation exposures will be quantitatively evaluated, but ingestion and dermal pathways are not evaluated because exposure from

these pathways will be mitigated by administrative controls and the use of PPE, respectively.

Appendix G should be revised to clearly and consistently state whether and for what reasons potential exposure of on-site remediation workers through inhalation is or is not evaluated quantitatively and why the ingestion and dermal pathways are not evaluated.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix H Page #: NA Line #: NA
Original General Comment #: 25
Comment: The CRARE approach does not consider risks posed by background concentrations of inorganic or radionuclide contaminants of concern (COC). Although the Risk Assessment Guidance for Superfund (RAGS) states that in some cases, naturally occurring levels of inorganics may be eliminated from the quantitative risk assessment, RAGS also states that if background concentrations present a significant risk, as at the FEMP site, then the background risk is an important site characteristic to those exposed. Background concentrations of inorganic COCs should be included in the CRARE approach. It should be noted that non-naturally occurring radionuclide sources can be more readily identified than sources of chemical contaminants. It is appropriate to eliminate naturally occurring levels of radionuclides from residual COC concentrations.

Also, option B of the CRARE includes inorganic and organic background concentrations but does not consider naturally occurring radionuclide levels. The text should be revised to replace the current CRARE approach with option B.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix H Page #: NA Line #: NA
Original General Comment #: 26
Comment: The text should provide a reference for the source of the background levels of COCs.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix J Page #: NA Line #: NA
Original General Comment #: 27
Comment: The text should discuss the potential presence of endangered, threatened, or special status species in an on-site wetland. These species should be considered before determining which wetlands will be lost as a result of cleanup activities. Also, the text should include a map delineating which wetlands will be lost.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix K Page #: NA Line #: NA
Original General Comment #: 28

Comment: The overall basis for estimating the costs of the remedial components seems reasonable; however, the use of the risk and contingency factors for the O&M cost estimates seems inappropriate and overly conservative. The rationale for using a contractor turnover rate of 2 years is not explained and should be.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix K Page #: NA Line #: NA
Original General Comment #: 29
Comment: The cost estimate for soil washing at the rate of 20 tons per hour does not reflect the cost savings that can be achieved using higher soil washing rates. Considering the large volumes of soil assumed for the soil washing component, a higher production rate should be used for cost estimating. Also, the contingency factor of 57 percent is not justified. The estimate should be revised to consider higher soil washing rates and lower contingency factors. A lower cost estimate for soil washing may allow soil washing on site and reduce the off-site soil disposal volume.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix K Page #: NA Line #: NA
Original General Comment #: 30
Comment: The rationale for the assumptions used to develop the risk and contingency factors is not explained. The use of the Monte Carlo technique in deriving the risk and contingency factors, especially for the soil washing and groundwater and wastewater treatment, should be explained. Also, the impact of the risk and contingency factors on the comparison of the alternatives should be discussed in Appendix K.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: NA Line #: NA
Original General Comment #: 31
Comment: The text assumes that the soil from contaminated areas less than 5 acres in size will not be removed; however, because of the lack of justification for this assumption, it is not clear why the contaminated soil from areas less than 5 acres in size will not be removed. The text should be revised to clarify this issue.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.10 Page #: NA Line #: NA
Original General Comment #: 32
Comment: Anticipated wastewater characteristics and flow rates are presented in several tables in Section L.10; however, the data and calculations used to estimate these characteristics and flow rates are not presented. Section L.10 should either be revised to present the missing information or provide a correct and complete reference to a

document containing the missing information. The availability of data and calculations used to estimate the wastewater characteristics and flow rates is important for independent verification of the anticipated wastewater characteristics and flow rates presented in Section L.10.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: NA Line #: NA
Original General Comment #: 33
Comment: Section L.2 presents several process flow diagrams (PFD). Each PFD is accompanied by a table that presents information on various streams in the PFD. These tables are presented in small font size and are poorly reproduced, which makes the tables difficult to read. The tables in PFDs should be revised to improve their readability.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: M.5.5.1 Page #: M-5-20 to M-5-21 Line #: NA
Original General Comment #: 34
Comment: This section states that dewatering/drying is effective in reducing the amount of material handled as a solid, is readily implementable, and is moderate in cost with negligible O&M cost. The cost of dewatering/drying could potentially be offset by reduced disposal costs due to less soil volume. The use of soil dewatering/drying as a support process option before disposal of the contaminated soil should be fully evaluated and considered for incorporation into the remedial alternatives in Section 4.0. Cost estimates for dewatering/drying and then disposal should be included in Appendix K.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Proposed Plan Page #: NA Line #: NA
Original General Comment #: 35
Comment: Aside from current inconsistencies between the OU 5 FS and the Proposed Plan (see General Comment 7), the Proposed Plan will need to be revised in accordance with any changes made to the OU 5 FS based on technical comments received by the U.S. Department of Energy (DOE).

SPECIFIC COMMENTS

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.3 Page #: 2-23 Line #: NA
Original Specific Comment #: 1
Comment: Table 2-3 summarizes COC by medium for each OU. Footnote "b" to this table indicates that the COCs for OU 5 were taken from the FS for OU 5. Section 2.3 is part of the OU 5 FS. Footnote "b" should be revised to indicate that the COCs for OU 5 were taken from the OU 5 RI.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.6 Page #: 2-30 Line #: NA
Original Specific Comment #: 2
Comment: Table 2-5 on Page 2-30 presents CPRGs for soil. The CPRG for total uranium with a leaching coefficient (K_l) of 15 is listed as 20 ppm. Later, in Section 2.8, Page 2-46, Lines 28 and 29, the CPRG for uranium with a K_l of 15 is listed as 5 ppm. This discrepancy should be resolved.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.7.3 Page #: 2-37 Line #: 21-24
Original Specific Comment #: 3
Comment: Section 2.7.3 identifies applicable or relevant and appropriate requirements (ARAR) and other criteria or guidance to be considered (TBC) for soil. The polychlorinated biphenyl (PCB) spill cleanup policy is identified as an applicable requirement. The PCB spill policy is also considered a criteria TBC and not an applicable requirement because the spill policy is not promulgated. In addition, Appendix B refers to the PCB spill policy as both an ARAR and a TBC. The text in Section 2.7.3 and Appendix B should be revised to correctly identify the PCB spill policy as a TBC.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.9 Page #: 2-49 Line #: NA
Original Specific Comment #: 4
Comment: Table 2-10 presents detection limits (DL) for contaminants by medium and moisture content. The source of the DLs presented is not specified. Because the detection limits are used to develop PRLs and may in fact be proposed as PRLs, the source of the DLs is very important so that the DLs presented can be verified. Table 2-10 should either be modified to present the source of the DLs or to refer to documents, such as OU-specific quality assurance project plans (QAPP) that document the DLs presented.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 2.12 Page #: 2-71 Line #: NA
Original Specific Comment #: 5
Comment: Section 2.12 lists the RAOs for OU 5. In Table 2-17, RAOs are listed for all media, including groundwater. A groundwater RAO addressing the restoration of aquifer quality to its highest beneficial use (drinking water) should be added to Table 2-17.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.3 Page #: 4-10 Line #: NA
Original Specific Comment #: 6
Comment: Section 4.1.3 presents the WAC for OU 5. Table 4-1 presents the WAC levels for COCs and for each remediation scenario. Table 4-1 lists values for total soluble and insoluble uranium. Because the uranium PRLs are associated with K_l values of 15 and 325, the WAC should also be linked to these differing K_l values. If other factors besides soil leachability affect uranium leaching such as differences in the solubility of the uranium, these factors should be explained and accounted for. In addition, it is not clear why the WAC for soluble uranium is greater than the WAC for insoluble uranium. Finally, it is not clear why WACs have been established for insoluble uranium because the table indicates that it has either not been analyzed for or has not been detected. The text should be revised to address these issues.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.5.2 Page #: 4-18 Line #: NA
Original Specific Comment #: 7
Comment: Section 4.1.5.2 identifies the remedial action area footprints associated with two groundwater treatment levels. The text in this section should clarify that the "remedial action area footprint" is synonymous with the "area of attainment" for groundwater cleanup levels. The area of attainment identifies the portions of the aquifer that will be restored to meet groundwater cleanup levels.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.5.2 Page #: 4-21 Line #: NA
Original Specific Comment #: 8
Comment: Figure 4-3 shows target remedial action areas for restoration of the GMA and the locations of existing and proposed extraction wells. Indication of the direction of groundwater flow would be helpful in understanding the placement of extraction wells. Arrows indicating groundwater flow direction should be included in the figure.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.1.5.3 Page #: 4-23 and 4-24 Line #: 1 and 2; 22 to 38
Original Specific Comment #: 9
Comment: Section 4.1.5.3 discusses remedy performance. The technical limitations to achieving groundwater cleanup levels and the possibility of DOE seeking a technical impracticability (TI) waiver if asymptotic conditions develop. U.S. EPA's recent guidance on applying the TI waiver to groundwater cleanup states that although the FS and record of decision (ROD) should discuss the technical limitations to achieving cleanup standards, only in very limited circumstances (such as at sites where dense, nonaqueous phase liquids exist) should the FS or ROD discuss future applicability of the TI waiver. The discussion regarding the TI waiver should therefore be removed from the FS.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.4.6 Page #: 4-110 Line #: 14 to 23
Original Specific Comment #: 10
Comment: Section 4.4.6 presents the initial screening evaluation of the C alternatives. The text states that the on-site consolidation area for materials containing uranium below the uranium WAC of 45 ppm would not meet the State of Ohio definition of solid waste. This reasoning is based on State of Ohio guidance that states that contaminated soil shall be managed as a solid waste unless it can be shown to be clean through a risk assessment. The text contends that the 45 ppm WAC was derived using a risk assessment and is protective of the intended receptor. It is doubtful that the State of Ohio considers the 45 ppm WAC for uranium as "clean." If the State of Ohio applies solid waste regulations to the C alternatives, then the C alternatives should be eliminated from further evaluation on the same basis that the B alternatives are eliminated.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.3 Page #: 5-9 Line #: 16
Original Specific Comment #: 11
Comment: The text states that the five criteria are known as "primary balancing factors;" however, Figure 5-2 shows only four evaluation criteria as primary balancing factors. The figure should be revised to include the cost of alternatives as a primary balancing factor.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.4.2.1 Page #: 5-22 Line #: 15 to 17
Original Specific Comment #: 12
Comment: The text states that Table 5-6 shows the number of rail cars that would be required to support off-site disposal assuming a bulk density of 1.76 tons per cubic yard of

excavated material. The calculations also assume 100 tons of excavated soil per rail car and 50 rail cars per train. The bulk density of 1.76 tons per cubic yard seems high for the excavated bulk soil. In addition, Appendix K, Page K-3-11, indicates that the number of shipments (rail cars) per scenario is based on an assumed density of 100 pounds per cubic feet (or 1.35 tons per cubic yard). This discrepancy should be corrected.

The text states that the calculations for the number of rail cars assume 100 tons of excavated soil per rail car; however, Appendix K, Page K-3-11, indicates that the net payload per rail car is 80 tons. This discrepancy should be clarified.

Finally, the number of rail cars (161,000) shown in Table 5-6 is incorrect based on 1.76 tons per cubic yard of excavated material and 100 tons of excavated soil per rail car. The correct number of rail cars should be 164,560 or about 165,000. The correct number of rail cars should be provided in all tables in Section 5.0 that present soil volumes for off-site disposal by rail transportation.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.4.2.2.4 Page #: 5-37 Line #: 19
Original Specific Comment #: 13
Comment: The text states that the quantity of soil containing RCRA hazardous PCB and petroleum wastes is estimated at 28,000 cubic yards. It is unclear whether Table 5-6 indicates this estimated quantity as excavated soil volume for off-site disposal. Table 5-6 should be revised to clarify this issue.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.4.2.2.6 Page #: 5-47 Line #: 20
Original Specific Comment #: 14
Comment: The text states that between 3,300 and 844 trains per year would leave the FEMP site for the 1,900-mile trip to the commercial disposal facility under Cases 1 and 2, respectively. Table 5-6 presents 12 and 3 trains per month or 144 and 36 trains per year, respectively. This discrepancy in the number of trains leaving the FEMP site per year should be resolved.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.4.4.1.3 Page #: 5-88 Line #: 25 to 26
Original Specific Comment #: 15
Comment: Section 5.4.4.1.3 states that the consolidation area associated with Alternative 2C would cover a portion of the production area. Figure 5-9 indicates that the consolidation area for Alternative 2C barely impacts the production area. This inconsistency should be resolved.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.6.2.3 Pages #: 5-161 and 5-162 Line #: 7 to 15
Original Specific Comment #: 16
Comment: The text indicates that the design life of the disposal cell is 1,000 years, and under the hypothetical failure models evaluated through the Monte Carlo simulation, the cell should be reliable over the full 200- to 1,000-year performance period described in 40 CFR 192. The text also states that the performance assessment provides a reasonable level of assurance that the on-property disposal cell will cause negligible impact to the GMA within the first 200 years. The text should provide more information on the Monte Carlo simulation, including the procedures used and assumptions made to run the simulation. In addition, the text should be revised to provide a quantitative confidence level, if possible, rather than the phrase "a reasonable level of assurance."

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 6.4 Page #: 6-11 Line #: NA
Original Specific Comment #: 17
Comment: Table 6-2 presents a comparative analysis of remedial alternatives and evaluation criteria. Under the evaluation criteria of "Overall Protection of Human Health and Environment" for Alternative 3A, the table indicates that the alternative is protective of the hypothetical on-property farmer for portions of FEMP and of the trespasser for the disposal area. According to Section 5.0, however, target receptors for Alterative 3A include an expanded trespasser in the disposal area and an industrial or recreational user for on-property areas outside the disposal area. This discrepancy should be resolved and also applies to Alternative 3C in Table 6-2.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 6.4.2.2 Page #: 6-22 Line #: 38
Original Specific Comment #: 18
Comment: The text states that soil washing is a promising technology for addressing contaminated soil; however, the technology is limited in its application at FEMP because of site-related constraints such as the presence of the sole-source aquifer beneath all potential treated soil backfill areas. It is not clear why this technology has limited application at the FEMP site or what the site-related constraints are. The text should explain in more detail why soil washing has been screened out as a primary remediation technology.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 7.1.5 Page #: 7-10 Line #: 25 to 33
Original Specific Comment #: 19
Comment: The text discusses deterioration of the caps over the on-site cell and the associated exposure pathways and states that these impacts would likely be insignificant based on the results of the CRARE. The CRARE states that the on-site cell caps are designed and assumed to last up to 1,000 years, the end of the CRARE time frame. The text should be revised to include this assumption and state that the CRARE does not consider scenarios associated with cap deterioration.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 7.1.5 Page #: 7-10 Line #: 32 and 33
Original Specific Comment #: 20
Comment: The text states that the CRARE is summarized in Section 7.4; however, the text does not include a Section 7.4. The CRARE is summarized in Section 7.2. The text should be revised accordingly.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: B Page #: B.1-20 and B.3-25 Line #: NA
Original Specific Comment #: 21
Comment: Appendix B presents ARARS and TBCs for OU 5. On Page B.1-20, the PCB spill policy is identified as a TBC. On Page B.3-25, the PCB spill policy is identified as a relevant and appropriate ARAR. The PCB spill policy is not promulgated and therefore is not an ARAR. This discrepancy should be resolved.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: B.4.1 Page #: B-4-4 Line #: 31
Original Specific Comment #: 22
Comment: Section B.4.1 discusses corrective action management unit (CAMU) rule requirements. Figure B.4-1 is referenced in the text but is not provided. Figure B.4-1 should be added to Section B.4.1.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.1 Page #: C-2-1 Line #: 14 and 15
Original Specific Comment #: 23
Comment: These lines attempt to define a hazard quotient (HQ); however, the denominator of the ratio, specifically the reference dose (RfD), is not included in the definition. The lines should be changed to the following or a similar phrasing: "The HQs are ratios of a single COC exposure level developed over a specified time period to a RfD developed over a similar exposure period."

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.2 Page #: C-2-5 Line #: 32
Original Specific Comment #: 24
Comment: This line presents Equation C.2-2, which is used to calculate air concentrations. The units of the term "air concentration" are presented as picoCurie/gram (pCi/g). These units are incorrect. The line should be revised to present the units of the term "air concentration" as pCi per cubic meter (pCi/m^3).

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.2 Page #: C-2-6 Line #: 18
Original Specific Comment #: 25
Comment: This line presents the unit risk for ingestion of meat as 6.8×10^{-8} $(pCi/g)^{-1}$. This value is incorrect. Section C.3.3.3, Equation C.3-72, Page C-3-26, Line 19, shows the correct value of 6.8×10^{-9} $(pCi/g)^{-1}$. Line 18 on page C-2-6 should be revised to present the correct unit risk.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.4 Page #: C-2-9 Line #: 1 to 3
Original Specific Comment #: 26
Comment: These lines state that the risk-based PRG for surface water exposure was calculated based on exposure to the expanded trespasser through incidental ingestion of surface water. This statement does not support why potential exposure to surface water through dermal contact is not also considered. Lines 1 to 3 should be revised to either justify the exclusion of potential exposure to surface water through dermal contact or the PRG for surface water should be recalculated.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.4 Page #: C-2-9 Line #: NA
Original Specific Comment #: 27
Comment: Equation C.2-6 presents the surface water PRG for uranium 238 (U238) based on an incidental ingestion value of 2.3×10^{-3} pCi per liter (pCi/L); however, performing the calculation presented gives a result of $2.3 \times 10^{+3}$ pCi/L, which is the PRG presented in Table C.2-9. Equation C.2-6 should be revised to present the correct value.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.2.6 Page #: C-2-10 Line #: NA
Original Specific Comment #: 28
Comment: Equation C.2-7 presents the surface water PRG for U238 based on ingestion of meat and milk products as 1.8×10^{-2} pCi/L; however, performing the calculation presented gives a result of $1.8 \times 10^{+2}$ pCi/L, which is the PRG presented in Table C.2-10. Equation C.2-7 should be revised to present the correct value.

Equation C.2-9 presents the calculation of the sediment PRG for U238 based on incidental ingestion and external exposure. This equation contains several errors. The unit risk (UR) for sediment pathways for U238 as shown in Line 29 on Page C-2-10 is 1.3×10^{-9} pCi/L. If equation C.2-9 is performed using this UR value, the calculated PRG should be $7.7 \times 10^{+2}$ pCi/L. This value differs from the value of 2.7 x 10+2 pCi/L presented in Table C.2-12. The other PRGs presented in Table C.2-12 are suspect. Equation C.2-9 should be revised to correctly present the calculation of the sediment PRG for U238. Also, the PRGs in Table C.2-12 should be reviewed and corrected as necessary.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1 Page #: C-3-1 Line #: 9 to 11
Original Specific Comment #: 29
Comment: These lines describe the location of the exposure parameters used to calculate unit risks and states that "...with the exception of those for the expanded trespasser, are listed in Tables A.3-21 to A.3-22 of the FEMP OU 5 Remedial Investigation." Several points regarding this statement need clarification. First, no Table A.3-21 is presented in the OU 5 RI. Lines 9 to 11 should therefore be revised to refer to Tables A.3-21a and A.3-21b. Second, Table A.3-22 is repeated in Appendix C as Table C.3-2. Also, Lines 9 to 11 should be revised to refer to Table C.3-2. Finally, Lines 9 to 11 do not explain where the exposure parameters for the expanded trespasser are located. The lines should be revised to provide this information.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1 Page #: C-3-1 Line #: 16
Original Specific Comment #: 30
Comment: This line refers to "PRG calculations for the expanded trespasser." Line 16 should be revised to instead refer to "PRG calculations for multiple age group receptors."

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.1 Page #: C-3-2 Line #: 3
Original Specific Comment #: 31
Comment: This line presents the units for the concentration of chemicals in air as cubic meters (m^3)/hour. These units are incorrect; Line 3 should be revised to present the correct units as milligrams per cubic meter (mg/m^3).

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-3 Line #: 21
Original Specific Comment #: 32
Comment: Equation C.3-6 presents the calculation for determining the concentration of a contaminant in or on vegetables and

fruits. As presented (including parameter definitions), the equation is incomplete because it does not include a term for the concentration in air of the contaminant. Section C.3.1.2 should be revised to modify Equation C.3-6 to include a term for the concentration of the contaminant in air.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-5 Line #: 10 and 11
Original Specific Comment #: 33
Comment: These lines present Equations C.3-11 and C.3-12 for calculating the intake of radionuclides and chemicals from the ingestion of vegetables and fruits. These equations should be revised to include the term "FT," which is defined as the fraction of a year homegrown produce is consumed (see Equations 7-15 and 7-16 of the FEMP Risk Assessment Work Plan Addendum).

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-5 Line #: 4, 25, and 33
Original Specific Comment #: 34
Comment: These three lines present the concentration of U238 in vegetables as 0.497, 0.492, and 0.489 pCi/g, respectively. These lines should be revised to consistently present the concentration of U238 in vegetables.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-5 Line #: 34 and 39
Original Specific Comment #: 35
Comment: These lines present the intake of U238 from vegetation as 7.31×10^{-5} and 7.43×10^{-5} pCi, respectively. The correct value calculated using Equation C.3-13 is $7.31 \times 10^{+5}$ pCi. These lines should be revised to consistently and correctly present the intake of U238 from vegetation.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.1.2 Page #: C-3-6 Line #: 16
Original Specific Comment #: 36
Comment: Equation C.3-15 presents the intake of U238 from vegetation as 7.308×10^{-5} pCi. As described in the previous comment, the correct intake value is $7.31 \times 10^{+5}$ pCi. Line 16 should be revised to correctly present the value for intake of U238 from vegetation.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2 Page #: C-3-11 Line #: NA
Original Specific Comment #: 37
Comment: This section discusses the calculation of PRGs for groundwater exposures. Possibly because the section uses U238 as the example contaminant, the exposure pathways discussed in the section do not include dermal contact and

inhalation; however, as stated in Section C.2.3, the PRGs for chemicals are calculated to include these additional exposure pathways. Section C.3.2 should be revised to clarify that PRGs for chemicals in groundwater are calculated based on exposure pathways, including the full range of residential exposure pathways as discussed in Section C.2.3.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2.1 Page #: C-3-12 Line #: 9 and 11
Original Specific Comment #: 38
Comment: These lines present Equations C.3-22 and C.3-23, which are used to calculate intakes through ingestion of drinking water. As presented, these equations include the term "FI," which is defined as the fraction ingested from the source. The term "FI" is not included in Equations 7-3 and 7-4 of the FEMP Risk Assessment Work Plan Addendum, which are the basis of Equations C.3-22 and C.3-23. Furthermore, Tables A.3-21a and A.3-21b, which are the source of the exposure parameter values used in Appendix C, do not include values for the term "FI." Equations C.3-22 and C.3-23 should therefore be revised to eliminate the term "FI."

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2.3 Page #: C-3-15 Line #: 37
Original Specific Comment #: 39
Comment: This line presents the units for the concentration of radionuclides in milk as pCi per milliliter (pCi/mL); however, an analysis of the units reported for the remaining parameters in Equation C.3-42 indicates that the units of the concentration of a radionuclide in milk should be pCi/L. Line 37 should be revised to correctly present the units for this parameter.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2.3 Page #: C-3-16 Line #: NA
Original Specific Comment #: 40
Comment: Equation C.3-43 is used to calculate the concentration of contaminants in plants as the result of irrigation with contaminated water. The equation as written is incomplete because it does not include a term for the concentration of the contaminant in water. Equation C.3-43 should be revised to incorporate a term for the concentration of the contaminant in water.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.2.3 Page #: C-3-17 Line #: 5
Original Specific Comment #: 41
Comment: Line 5 refers to the "reproductive" portions of feed plants; however, the value presented in this line for the parameter $B_{iv(l)}$, defined as the dry soil to wet plant

partitioning coefficient, corresponds to the "vegetative" portions of plants. Line 5 should be revised to refer to the "vegetative" portion of plants.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.3.3 Page #: C-3-25 Line #: 6
Original Specific Comment #: 42
Comment: Line 6 presents the concentration of U238 in meat as 0.85×10^{-4} pCi/g. This value is incorrect. The correct value calculated using Equation C.3-67 and as reported in Line 28 on this page is 1.85×10^{-4} pCi/g. Line 6 should be revised to present the correct value.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: C.3.5.2 Page #: C-3-32 Line #: 14
Original Specific Comment #: 43
Comment: Line 14 states that each additional pCi/g of U238 in sediment increases the source strength by 41.5 picocurie-year per gram-life (pCi-y/g-life). Equation C.3-90 (using a slope factor for U238; see Table C.4-3) indicates that the increase in source strength for each additional pCi/g is 7.1×10^{-2} pCi-y/g-life. Line 14 should be revised to present the correct source strength value.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: E.5.0 Page #: E-5-1 Line #: 19 to 22
Original Specific Comment #: 44
Comment: The text states that the commercial disposal facility's radioactive material license, granted by the Utah Department of Environmental Quality, establishes maximum average concentrations of individual isotopes permissible in the waste disposed. The maximum concentrations permissible should be included in the document, and the impact these may have on the disposal of OU 5 soil, sediment, and treatment residuals at the facility should be evaluated.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.4 Page #: F-1-5 Line #: 14 to 23
Original Specific Comment #: 45
The text in this passage states that protective requirements in air and surface water pathways are not used to develop CPRGs because the contaminant sources in these pathways consist of contaminated residual surface soil; however, radon emanation from contaminated soils and other areas can be a significant source of air contamination, and sediments exposed in the SSOD and Paddys Run during the dry seasons may also significantly contribute to air emissions. Also, the sources of surface water contamination consist of other surface water bodies draining into local streams, contaminated perched groundwater discharging to Paddys Run, and contaminated GMA groundwater discharging to the Great

Miami River. The text should clearly indicate whether these sources have been considered in the development of CPRGs. If they have not been considered, their omission should be justified.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.3.2 Page #: F-1-12 Line #: 3 to 4
Original Specific Comment #: 46

The text discusses the computer code VS2DT and states that the output provides information about infiltration volumes and patterns in the GMA. It is not clear what the term "infiltration patterns" refers to. More explanation regarding the infiltration patterns should be provided.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.3.2 Page #: F-1-12 Line #: 4 to 6
Original Specific Comment #: 47

The text states that infiltration information is used to calculate contaminant concentrations and loadings. Presumably, the text refers to loading to the GMA; however, additional detail regarding the calculations of concentrations and loadings to the GMA should be provided.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.3.2 Page #: F-1-12 Line #: 15 to 24
Original Specific Comment #: 48

The text discusses the calculations of future sediment loadings and their impacts. It is not clear if increased sediment loadings associated with the remedial action construction activities have been considered. The text should either indicate that this loading has been accounted for or provide justification for its omission.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-17 Line #: 39
Original Specific Comment #: 49

The text states that new infiltration rates and infiltration rate zones were calculated based on updated geological information. The text should indicate whether this new information is presented in the OU 5 RI or has just become available. The text should also indicate the source for which this information is presented.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-18 Line #: 32 to 36
Original Specific Comment #: 50

The text states that the long breakthrough times calculated in the RI do not change the conclusions regarding the maximum levels and sources of GMA contamination and that uranium contamination in the GMA will reach 9 milligrams per liter (mg/L) in 200 years. Although this statement may be true, risk-based thresholds such as maximum contaminant

levels (MCL) will be exceeded much sooner. More tangible examples of breakthrough times using MCL exceedances should be provided.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-19 Line #: 10
Original Specific Comment #: 51

The text states that breakthrough times associated with the lower K_d value are 50 times shorter than the baseline cases presented in the draft RI report. The text should be revised to indicate that the breakthrough time is 5 times shorter.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-19 Line #: 13 to 22
Original Specific Comment #: 52

The text presents various justifications for using a K_d value of 24 liters per kilogram (L/kg) for the engineered clay liner. Unless the engineered clay liner is constructed of materials other than FEMP grey clay, the use of a K_d value nearly one order of magnitude higher than the K_d values used for the grey clay is not justified. The text further states that the use of high-quality clay material with high carbonate content justifies the use of the higher K_d value. This statement is confusing because high-quality clay implies high phyllosilicate and low carbonate content. The selection of K_d values for the engineered clay liner should be based on a statistically valid set of analytical results from the materials ultimately chosen for the liner. The issue of K_d values for the clay liner should be clarified.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.1.5.4 Page #: F-1-19 Line #: 25 to 30
Original Specific Comment #: 53

The text in this paragraph discusses adjusting model layer thicknesses to simulate the effect of dispersion under low infiltration rates and large layer thicknesses. The rationale for performing these layer thickness adjustments is not clear because contaminant concentration changes due to vertical dispersion in unsaturated flow regimes. Further justification for adjusting model layer thicknesses should be provided.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.2.2.2 Page #: F-2-5 Line #: 1 to 30
Original Specific Comment #: 54

This section discusses the delineation of areas capable of sustaining a yield of 1 gallon per minute (gpm) from perched groundwater zones. The areas delineated are apparently controlled by the location of pumping tests; however, these

tests were only performed near the production area. The importance of accurately determining the areas of 1 gpm yields should be presented to assess whether additional data needs exist. It seems likely that areas in the western portions of the FEMP site, where deltaic sands are present, will also produce yields of greater than 1 gpm. This issue should be addressed.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.2.2.3 Page #: F-2-6 Line #: 22 to 23
Original Specific Comment #: 55

The text states that vertical seepage velocities through the glacial overburden are controlled by the thickness of the grey clay. It is not clear how a layer thickness can control the seepage velocity through it. The text should be revised to clarify this issue.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.2.2.5 Page #: F-2-7 Line #: 24 to 30
Original Specific Comment #: 56

The text provides estimates of infiltration rates for areas where glacial overburden is present; however, when these estimates are compared to the vertical advective travel times presented in Section F.2.2.3, major volume problems appear. For instance, when the vertical advective travel time is 41.4 years in a 30-foot thick grey clay layer, 20.7 feet of water will have infiltrated into the grey clay before the water that infiltrated at the beginning of the 41.4-year period moves out of the grey clay. This scenario would require a porosity of 69 percent. This issue and its implications on assumed infiltration rates and vertical advective travel times should be addressed.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.3.2.5 Page #: F-3-7 to F-3-8 Line #: NA
Original Specific Comment #: 57

The text states that surface water dilution factors were developed using estimated perched groundwater discharge rates into Paddys Run and the Pilot Plant Drainage Ditch. The text should indicate how the perched water discharge rates were established.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.3.2.5 Page #: F-3-8 Line #: 15 to 20
Original Specific Comment #: 58

Equation 7 gives an estimated surface water infiltration rate to the GMA of 0.099 cubic feet per second (cfs) and an estimated flow rate for the Great Miami River of 0.067 cfs. These figures should be checked for accuracy because the estimated surface water infiltration rate to the GMA (0.099 cfs) coincidentally corresponds with the estimated total seepage rate of perched groundwater to surface water

bodies. The estimated flow of the Great Miami River corresponds to a flow rate of approximately 0.5 gallons per second. This figure seems extremely low for a stream the size of the Great Miami River. Also, if these estimates are erroneous, the calculations that use them should be corrected and the effect of these errors should be identified.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.3.2.6 Page #: F-3-9 Line #: 29
Original Specific Comment #: 59
The text states that a minimum mixing depth of 10 feet below ground surface was used in the GMA. The text should provide the maximum mixing depth used in GMA modeling and provide justification for this value.

Commenting Organization: U.S. EPA Commentor: Saric
Sections #: F.4.2.1.1 Page #: F-4-2 Line #: 8
Original Specific Comment #: 60
Comment: The first set of protective requirements for the air pathway were developed based on an ILCR of 10^{-5}, but those for the surface water pathway were developed using an ILCR of 10^{-6}. The rationale for selecting an ILCR of 10^{-5} for the air pathway should be presented.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.4.3
Page #: F-4-9 and Table F-4-4 Line #: 10 to 18
Original Specific Comment #: 61
Comment: The estimated airborne gram per cubic meter (PM_{10}) concentration for Station AMS 7 presented in Table F-4-4 appears erroneous. Based on particulate concentrations in air and soil, the PM_{10} concentration value should be 2.4×10^{-4} g/m^3 instead of "2.4×10^{-6} g/m^2" as presented in the table. The 2.4×10^{-4} g/m^3 value is also the highest PM_{10} concentration. Table F-4-4 and the text should therefore be revised to consistently list the correct value. The air pathway protective requirement values should also be recalculated using a PM_{10} concentration of 2.4×10^{-4} g/m^3.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Table F-4-6 Page #: NA Line #: NA
Original Specific Comment #: 62
Comment: The partition coefficient values presented in this table are not referenced. The source of these values should be presented.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.4.4.1 Page #: F-4-12 Line #: 27
Original Specific Comment #: 63
Comment: This line states that only two contaminants do not pass the screening steps; however, text in subsequent lines indicate that four contaminants consistently fail the screening steps. The text should be revised to list the number of contaminants that do not pass the screening steps.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Tables F-4-9 through F-4-13, F-4-15, and H-3-3, H-3-6, H-3-9 Page #: NA Line #: NA
Original Specific Comment #: 64
Comment: These tables list soil concentrations of several contaminants. Some of the values are presented as "0.00." This presentation is misleading. Results of chemical analyses should be presented either as a detected value or as a value less than the detection limit. These tables should therefore be revised to eliminate the presentation "0.00" and replace it with appropriate numbers. The detection limits should be specified to allow comparison with other values presented in the tables.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Table F-4-14 Page #: NA Line #: NA
Original Specific Comment #: 65
Comment: Values for soil bulk density, layer thickness, soil porosity, and soil moisture content presented in this table are not referenced. The source of these values should be provided.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.5.2.2 Page #: F-5-4 Line #: 29 to 33
Original Specific Comment #: 66
This section presents general considerations and characteristics of WAC development. The text states that high-yield areas of perched water and lateral migration in the perched water zone underlying the potential on-property disposal areas will be minimized by engineering controls or removed by excavation. Because few production or waste management activities were conducted in the proposed consolidation/disposal cell area, the hydrogeology of the area is not well characterized. Also, Figure F.2-6 indicates that an area of coarse-grained sediment is present below the proposed disposal cell area; however, its lateral extent is not well defined. It is not clear how or when the hydrogeological data gaps associated with the design and construction of the consolidation/disposal cell area will be addressed. Finally, the excavation of perched water zones may not ensure that other perched water zones will not redevelop because some of these areas are formed by

underlying aquitards impeding vertical flow. The text should be revised to discuss these issues.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.2.1.1 Page #: F-6-6 Line #: 24 to 27
Original Specific Comment #: 67
Comment: The text states that "source concentrations within perched groundwater outside of Infiltration Zone V do not function as sources of contamination in the perched groundwater analysis" and that "these areas will be remediated concurrently with the overlying soils." According to Figure F-6-2, areas outside of Zone V have significant uranium concentrations. The text should specifically state why these areas are not considered in the perched groundwater analysis. Also, the text should state how these areas will be remediated "concurrently with overlying soils."

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.2.1.3 Page #: F-6-7 Line #: 16 and 17
Original Specific Comment #: 68
Comment: The text states that in the perched groundwater system, "the vertical discharge rate is relatively constant even with pumping." The text should further explain this statement because pumping would decrease the head in the perched groundwater zone and therefore would decrease the vertical gradient, discharge rate, and movement of contaminants from the perched groundwater to the GMA. This explanation will also clarify why vertical recharge is not included in net influx of groundwater (Q_I) to perched groundwater.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.2.1.3 Page #: F-6-9 Line #: 11
Original Specific Comment #: 69
Comment: The text refers to Table F-6-5 for parameters used to calculate perched groundwater discharge rates to ditches. The text or table should provide a reference for the 3.55 feet per day rate for discharge of perched groundwater to the ditches.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.3.1.2 Page #: F-6-14 Line #: 16 to 20
Original Specific Comment #: 70
Comment: The text states that Excavation Footprint 1 includes groundwater zone areas outside of Infiltration Zone V and that these areas will be excavated regardless of the remedial option selected for Infiltration Zone V. According to Figure F-6-2, perched groundwater uranium contamination also exists by the OU 1 waste lagoons north of Infiltration Zone V. It is not apparent if this contaminated perched

groundwater will also be excavated. The text should discuss how this area outside of Infiltration Zone V will be remediated.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.3.1.2 Page #: F-6-15 Line #: 1 and 2
Original Specific Comment #: 71
Comment: The text states that the effects of constituent-specific distribution coefficients (K_d) and layer thickness were taken into account to estimate excavation footprints. The text should be revised to specify how these parameters were taken into account to estimate the excavation footprints.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.3.1.2 Page #: F-6-15 Line #: 24
Original Specific Comment #: 72
Comment: The text states that Tc99 concentrations of greater than 35 pCi/L were included in the initial Excavation Footprint 1. The text should state why Tc99 concentrations of greater than 35 pCi/L were included in Excavation Footprint 1.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.3.1.3 Page #: F-6-17 Line #: 23 to 25
Original Specific Comment #: 73
Comment: The text states that uranium K_d values of 3.1 and 15 L/kg were used in the model. According to Table F-6-2, uranium K_d values of 1.78 and 15 L/kg were used for modeling. This inconsistency should be corrected.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.6.5.2 Page #: F-6-31 Line #: 8 and 9
Original Specific Comment #: 74
Comment: The text refers to Tables F-6-21 and F-6-22 for the uncertainty analysis of K values in the remediation scenarios. Tables F-6-21 and F-6-22 present K_d values and not K values. The text should include and correctly refer to tables showing the uncertainty analysis for K values.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.1 Page #: F-7-5 Line #: 13 and 14
Original Specific Comment #: 75
Comment: The text states that the FEMP production well is turned off for the groundwater modeling simulations. The text should state if the production well will be in operation when the groundwater remediation of the GMA occurs.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.4 Page #: F-7-8 Line #: 11
Original Specific Comment #: 76
Comment: The text refers to Figure F-7-7 for initial concentrations in model layers 4, 5, and 6. These model layers represent the confining clay unit in the GMA and the lower GMA. According to the figure, limited amounts of contamination are present in these layers; however, additional uranium contamination in these model layers of the GMA seems to be missing. Plate E-82 from the OU 5 RI depicts total unfiltered uranium concentrations in Types 3 and 4 (lower GMA) monitoring wells. Plate E-82 shows uranium contamination in the lower GMA beneath OU 1, OU 2, Paddys Run, the South Plume area, and other areas beneath FEMP. The data for all lower GMA monitoring wells should be reviewed for uranium detections in groundwater, and the figure and initial source concentrations should be revised accordingly, if necessary.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.4 Page #: F-7-8 Line #: 20 and 21
Original Specific Comment #: 77
Comment: The text states that "most of the contamination found in Type 4 monitoring wells is from suspected leaking wells and is relatively localized." The text should provide additional evidence supporting the statement that the contamination is from leaking monitoring wells and not from vertical migration of contamination.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.7 Page #: F-7-9 Line #: 20 and 21
Original Specific Comment #: 78
Comment: The text refers to Table F-7-5 as presenting modeling parameters for other COCs in the GMA that have concentrations greater than screening levels. The K_d values shown in Table F-7-5 appear to be the upper limit of K_d values reported for contaminants in Table F-2-5 of Section F.2.4. The text should state why the upper limit of K_d values were used for the contaminants.

In addition, according to Table F-7-5, there is no loading of volatile organic compounds (VOC) from Paddys Run to the GMA. Plates E-132 and E-133 show VOC contamination in Type 2 (upper GMA) and Types 3 and 4 (lower GMA) monitoring wells, respectively. These plates show groundwater plumes near Paddys Run and the SSOD, apparently indicating that contaminated surface water is contaminating the underlying GMA. The text should either explain why there is no loading of VOCs from Paddys Run to the GMA in Table F-7-5 or be revised to show the VOC loading rates from the surface water bodies.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.2.8 Page #: F-7-10 Line #: 22 to 25
Original Specific Comment #: 79
Comment: The text discusses sensitivity analysis of K_d values by changing the K_d value to 12 to model the effect of higher K_d values on concentrations of uranium in the GMA. The text should state why a K_d value of 12 was chosen to model this effect.

Also, the text states that after increasing K_d, the dissolved concentrations of uranium in the GMA were adjusted to reset the total sorbed mass approximately back to the original value that occurred at time equal to zero (t=0) or 1995 conditions. Adjusting the dissolved concentrations in the GMA to retain the total sorbed mass seems to present dissolved uranium concentrations in the GMA at t=0 that are not realistic or similar to presently detected concentrations in the GMA. Modeling based on these methods, therefore, would yield future remedial scenarios that are also not realistic. The text should state how adjusting the total dissolved concentrations applies to places the future remedial scenarios modeled. This comment also applies to places in text that discuss the performance of sensitivity analyses of K_d values and should be addressed in these areas as well.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 7.3.2 Page #: F-7-11 Line #: 39 to 43
Original Specific Comment #: 80
Comment: The text refers to Figure F-7-20 for uranium concentration contour plots in layer 1 of the GMA at 345 years, respectively, from t=0 and states that the plume has shifted east. The text should explain why the plume has shifted east and away from the FEMP site at 345 years after t=0.

Also, under the no-additional-action scenario, groundwater in the GMA beneath the FEMP site flows south and east (see Figure F-7-105). The text should provide information supporting the claim that the South Plume recovery wells pumping under the no-additional-action scenario can remediate contaminated groundwater flow beneath the FEMP site to the east.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.3.2 Page #: F-7-11 Line #: NA
Original Specific Comment #: 81
Comment: The text discusses the modeling results of the no-additional-action remediation scenario for uranium concentrations in the GMA. The text should state how this remediation scenario affects other COCs in the GMA.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.3 Page #: F-7-15 Line #: 25 and 26
Original Specific Comment #: 82
Comment: The text states that model layer 2 will take the longest time to remediate; however, curves representing the remediation time for model layer 2 are not provided for review. Remediation curves for this model layer and a discussion of how the remediation time for model layer 2 was determined should be provided because concentrations in model layer 2 are actually an approximation based on concentrations in model layers 1 and 3 (see Section F.7.2.4, Page F-7-8). Layer 2 is usually the layer that requires the longest time to remediate in other remediation scenarios also; therefore, this comment also applies to these other remediation scenarios and should be addressed.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.4 Page #: F-7-16 Line #: 31 to 35
Original Specific Comment #: 83
Comment: The text states that the lower model layers will require a longer remediation time because the extraction pumps are placed in the shallow aquifer. The text should explain how groundwater in the lower layers of the GMA will be remediated by extraction pumps in the shallow aquifer or upper model layers of the GMA.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.6 Page #: F-7-18 Line #: 34 and 35
Original Specific Comment #: 84
Comment: The text states that based on modeling, Tc99 has been identified in plumes originating at the Waste Pit Area and South Field. The text should explain if any groundwater samples confirm the Tc99 contamination of groundwater.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.6 Page #: F-7-19 Line #: 36 to 38
Original Specific Comment #: 85
Comment: The text states that trichloroethene (TCE) concentrations are relatively quickly reduced from over 1,000 micrograms per liter (μg/L) to below the MCL of 5 μg/L. The text should also present the time required to reduce the TCE concentration to 5 μg/L.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.4.6 Page #: F-7-19 Line #: 45 and 46
Original Specific Comment #: 86
Comment: The text states that "apparent elevated concentrations or plumes of other constituents at certain areas may not be due to FEMP releases" or that they may be naturally occurring. The text should either provide background concentrations or further evidence supporting the statement

that some of the contaminant plumes detected may not be from FEMP releases.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.5 Page #: F-7-21 Line #: 12 to 14
Original Specific Comment #: 87
Comment: The text states that "contour output from year 25 from the restoration to 20 μg/L design, with the more aggressive 7,500 gallon per minute (gpm) rate, was inspected to determine the locations of remaining plumes." The text should state why data from year 25 was chosen for this analysis.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.2 Page #: F-7-26 Line #: 35 to 39
Original Specific Comment #: 88
Comment: The text states that an analysis was performed to determine the impact of lost uranium mass in the model from cell dewatering. The text provides the results of the analysis but not information detailing how the analysis was performed. The text should provide information concerning the analysis of the lost uranium mass in the model because it affects the estimated mass of uranium that must be removed and the time required for groundwater cleanup.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.3 Page #: F-7-27 Line #: 20 to 25
Original Specific Comment #: 89
Comment: The text states that "with the strong vertical gradients produced by the shallow extraction pumping, longitudinal dispersivity would operate in the vertical direction and this relatively high dispersivity would cause excessive dispersion vertically, resulting in vertical downward migration of solute." The text also states that vertical dispersion results in a significant mass of uranium in the lower model layers (lower GMA) are not consistent with conceptual models of contaminant transport. The extraction pumps would cause water levels in the shallow aquifer to decrease, thereby decreasing the vertical gradient; consequently, contaminants will migrate from the shallow GMA aquifer to the lower GMA aquifer. Also, vertical migration of contaminants should be retarded by the clay layer (model layer 4) in the GMA. The fate and transport model should be reviewed and revised as necessary because the vertical migration of contaminants should decrease with pumping of the shallow extraction pumps.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.4 Page #: F-7-29 Line #: 3 and 4
Original Specific Comment #: 90
Comment: The text states that continued surface water loading becomes a major factor controlling cleanup time; however,

uranium concentration contours in the GMA do not seem to be influenced by surface water loading (see Figures F.7-18 to F.7-20). The text should explain why surface water loading does not seem to control the concentration contours in the figures.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.6 Page #: F-7-31 Line #: 6 to 18
Original Specific Comment #: 91
Comment: The text states that model constant head boundaries would be affected by pumping from the remediation scenarios; however, because they are constant head boundaries, the water levels at these boundaries should not change, thereby causing artificially high groundwater gradients. The text also states that this effect is acceptable to select a preliminary remediation scenario; however, the artificially high groundwater gradients increase the rate of groundwater flow and contaminant movement, which in turn decreases the estimated time for contaminant cleanup. The text should explain in more detail why this effect on boundary conditions is acceptable during the FS.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.7.7 Page #: F-7-31 Line #: 25 to 31
Original Specific Comment #: 92
Comment: The text discusses the removal of suspended solids from the GMA by the extraction pumps. The text should discuss if the removal of suspended solids affects the concentration of adsorbed contaminant concentrations or the degree of retardation.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.8.1 Page #: F-7-32 Line #: 26 to 31
Original Specific Comment #: 93
Comment: The text states that a pumping test will be conducted in the South Field area to better define aquifer properties in the area. These aquifer properties will then be used to determine the location of extraction wells in the area. According to the preliminarily chosen remediation scenario, extraction wells will also be located by the OU 1 waste lagoons. The text should state if a pump test will be performed or has been performed in the OU 1 area to better define aquifer properties, and if not, why.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: F.7.8.2 Page #: F-7-34 Line #: 37 to 39
Original Specific Comment #: 94
Comment: The text states that reinjection wells could induce flow reversals and other hydraulic gradient changes to increase extraction rates. The reinjection wells could also produce groundwater mounds and assist in the lateral spreading of contaminants. This scenario is evaluated in

the perched groundwater remediation scenario (see Section F.6.3.3.2, Page F-6-24). Groundwater mounding and lateral spreading of contaminants could cause larger than anticipated contaminant plumes, decreased extraction well efficiency rates, and increased time for remediation. The text should address these issues concerning the reinjection wells.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.1.0 Page #: G-1-1 Line #: 26
Original Specific Comment #: 95
Comment: This comment references U.S. EPA's RAGS, Part A, as "(EPA 1991a)." RAGS, Part A, was published in 1989. Line 26 and the corresponding reference section should be revised to correctly reference RAGS, Part A.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.2.2.2.2 Page #: G-2-16 Line #: NA
Original Specific Comment #: 96
Comment: Table G.2-2 presents component-level release mechanisms. The potential exposure pathways under Component 1 do not include the inhalation pathway for the on-site remediation worker; however, Figure 6.2-1 includes this pathway, and potential exposures to on-site remediation workers through inhalation are discussed throughout the appendix. Table G.2-2 should therefore be revised to include inhalation by on-site remediation workers as a potential exposure pathway under Component 1.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.2.2.2.5 Page #: G-2-13 Line #: 22 to 24
Original Specific Comment #: 97
Comment: These lines state that "This study also assumes protective clothing will be worn by the workers to reduce the potential for inhalation, dermal, and ingestion exposures." Figure G.2-1 shows that potential exposures to on-property remediation workers through inhalation will be evaluated, but potential exposures through dermal contact and incidental ingestion will not be evaluated because the use of PPE mitigates these pathways. Similarly, Table G.3-2 indicates that potential exposures for the on-property remediation worker through inhalation are quantified, but potential exposures through incidental ingestion and dermal contact are mitigated through administrative controls and the use of PPE, respectively. Appendix G should be revised to clearly and consistently discuss whether potential exposures through inhalation are evaluated as part of the short-term risk assessment. Appendix G should also be revised to provide the rationale for any decision to quantify potential exposures for on-property remediation workers in light of the statement made in Lines 22 to 24 on Page G-2-13.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.3.2.2 Page #: G-3-3 Line #: 1 to 8
Original Specific Comment #: 98
Comment: These lines define the parameters used in the calculation of intakes through the inhalation pathway; however, the text does not indicate where the values used for these parameters are located. Section G.3.2.2 should be revised to specify where the parameter values are located.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.3.2.1 Page #: G-3-9 Line #: NA
Original Specific Comment #: 99
Comment: Table G.3-1 presents exposure point concentrations in soil. Some of the values are presented as "0.00." This presentation is misleading. Insufficient data was collected to definitively determine that any of the contaminants is not present at FEMP; therefore, Table G.3-1 should be revised to eliminate all use of the presentation "0.00" and replace it with appropriate terms indicating whether the contaminant was not analyzed for in a particular area or the concentration was less than detection limits.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.3.4.2 Page #: G-3-25 Line #: NA
Original Specific Comment #: 100
Comment: Table G.3-5 presents injury and fatality hazard coefficients. The table does not specify which coefficients are used to represent each process or component. For example, Tables G.3-4 and G.4-6 indicate that injuries during excavation and off-site disposal were calculated using the injury coefficient for general building contractors, but injuries associated with groundwater treatment were calculated using the injury coefficient for electric, gas, and sanitary services. Table G.3-5 should be revised to specify which coefficients were used to calculate fatalities and injuries associated with each process or component.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.4.1.3 Page #: G-4-11 Line #: NA
Original Specific Comment #: 101
Comment: Table G.4-3 presents selected human health risks for on-site remediation workers. The carcinogenic sum for excavation under Alternative 3a, Case 7, is presented as 9.4×10^{-4}; however, a check of this sum reveals that it is incorrect. Table G.4-3 should be revised to present this carcinogenic sum as 1.5×10^{-3}.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: G.I.1.3 Page #: G-I-18 to -26 Line #: NA
Original Specific Comment #: 102
Comment: A check of a sample of the results indicates that Tables G.I-2 through G.I-4 may contain errors in the risks presented. For all three tables, the ILCR calculated as shown in each table's footnotes appear to be two orders of magnitude too high. For example, in Table G.I-2, the ILCR presented for U238 + d under Case 1 is 1.1×10^{-5}. The calculated value is 1.1×10^{-7}. Also, in Tables G.I-2 and G.I-3, the chronic exposure dose equivalents (CEDE) presented for Radium 226 + d, U235 + d, and Thorium 232 + d are all incorrect. The incorrectness of these values can easily be verified by noting that the CEDE values for Thorium 232 + d under Cases 1 and 2 are both presented as 19.0 even though the number of workers under the two cases is different. Tables G.I-2 through G.I-4 should be closely reviewed and all calculations verified and corrected as necessary. The text should be revised as necessary to reflect any corrected values.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.2.3 Page #: H-2-8 Line #: 31
Original Specific Comment #: 103
Comment: The text states that all chemicals of potential concern (CPC) collectively posing 95 percent or greater of the total risk are identified as COCs. The remaining CPCs are not evaluated in the CRARE for OU 5. RAGS, Section 5.9, suggests that COCs posing 99 percent of total cancer risk or hazard be presented in the main text of the report and that the remaining chemicals be presented in the appendixes. The document should be revised to include the rationale for including only CPCs posing 95 percent or greater of the total risk or hazard and not including the remaining chemicals in the appendixes.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.4.1 Page #: H-4-1 Line #: 23 and 24
Original Specific Comment #: 104
Comment: The text does not consider workers that will maintain the on-site disposal cells or trespassers that may be exposed to the disposal cell as target receptors in the undeveloped park scenario. The text should be revised to either include these receptors as target receptors or include an acceptable rationale for their exclusion.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.4.1 Page #: H-4-2 Line #: NA
Original Specific Comment #: 105
Comment: Figure H.4-1 states that the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) risk assessment methods for radionuclides do not address external radiation exposure in air. Section 10.5.5 of RAGS presents a method to calculate external exposure to radionuclides in air. The baseline risk assessment from the RI for OU 5 states that the contribution to exposure from this pathway is negligible. The text should be revised to include a rationale for exclusion of airborne radionuclides similar to that presented in the OU 5 RI baseline risk assessment.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.4.5.2 Page #: H-4-26 Line #: NA
Original Specific Comment #: 106
Comment: The reasonable maximum exposure risk value for direct radiation is not provided in Table H.4-8. The missing value is mistakenly shown as the risk value for ingestion of vegetables and fruits contaminated with radionuclides. The table should be revised to include the correct risk values.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.5.7.5 Page #: H-5-9 Line #: 15 and 16
Original Specific Comment #: 107
Comment: The text states that an adult is more likely to consume 1.4 liters per day (L/day) of drinking water than the 2 L/day default value provided by U.S. EPA. A reference for this statement should be provided.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.5.7.5 Page #: H-5-9 Line #: 17 to 19
Original Specific Comment #: 108
Comment: The text states the contaminant levels in consumed drinking water will most likely be less than the default values. The default values mentioned should be defined and referenced in the text.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.IV and H.V Page #: NA Line #: NA
Original Specific Comment #: 109
Comment: An attempt was made to reproduce the chronic daily intake (CDI) values presented in Tables H.IV-5 and H.V.1-5; however, the values differ by a factor of 1×10^{-6} from CDI values listed in the tables. A unit analysis was performed and all units canceled accurately; therefore, it appears that the radionuclide concentrations presented in pCi per milligram (pCi/mg) are actually in pCi per kilogram (pCi/kg) concentrations. The radionuclide concentrations in these

and all similar tables should be reviewed and revised as appropriate.

Tables H.IV-10 and H.V.1-10 also present CDI values; however, the CDI values presented could not be duplicated when checked. The outdoor shield factor is apparently missing from the tables and it is unclear why an indoor shield factor is presented when the receptor indoor exposure time is not applicable. These and similar tables should be reviewed and calculations should be corrected as necessary.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: H.3.4.2 Page #: H-3-19 Line #: 30 and 31
Original Specific Comment #: 110
Comment: The partition coefficient values presented in these lines are not referenced. The source of these values should be provided.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-2 Line #: NA
Original Specific Comment #: 111
Comment: Figure L.1-1 shows that segregated and pretreated soil with contaminant levels below PRLs will be loaded, transported, and stockpiled for backfilling. The rationale behind loading and transporting soil with contaminant concentrations below PRLs is not clear. Perhaps the symbol "< PRL" is mistakingly used in place of "> PRL." The figure should be checked and corrected if necessary.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-3 Line #: 9 and 10
Original Specific Comment #: 112
Comment: The text states that analytical detection levels and procedures may range from the hand-held field instruments to laboratory procedures. Analytical detection levels are chemical concentrations and not instruments or procedures. The text should be revised to clearly state the analytical detection levels.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-7 Line #: 13 and 14
Original Specific Comment #: 113
Comment: The text states that some suspect areas may be reduced in size to below the 5-acre limit and therefore will not require remediation. As discussed in General Comment 29, the rationale for not remediating areas less than 5 acres in size is not clear and should be explained.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-10 Line #: 22 to 25
Original Specific Comment #: 114
Comment: The text in Lines 22 and 23 states that sampling will extend to the water table or to a depth of 5 feet below the depth of the RI sample that indicated contaminant presence; however, the text in Lines 24 and 25 states that samples will be collected until the bottom of the boring is reached. The text should be revised to resolve this inconsistency.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-11 Line #: 10 to 12
Original Specific Comment #: 115
Comment: The text states that the coarse-grained material will be removed if it can sustain a yield of 1 gpm for at least 2 days. The text should be revised to clarify what will happen to the coarse-grained material that does not have a sustained yield of 1 gpm for 2 days, but that contains contaminant concentrations above the PRL.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-11 Line #: 24 to 26
Original Specific Comment #: 116
Comment: The text states that the boring will advance until at least 3 feet of till has been penetrated below the water-bearing unit or until the boring is within 5 feet of the base of the glacial overburden, whichever comes first. Because the elevation of the base of glacial overburden varies with location and may not be known at the locations of some boreholes, the text should clarify how it will be determined that the boring is within 5 feet of the base of the glacial overburden.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-18 Line #: 17
Original Specific Comment #: 117
Comment: The phrase "below acontaining HWMU" is unclear and appears to be missing words. The text should be reviewed and corrected as necessary.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.1 Page #: L-1-20 Line #: 3 to 6
Original Specific Comment #: 118
Comment: The text states that final certification sampling will be conducted to indicate with reasonable confidence that the area's average contaminant concentrations are statistically above the cleanup standards established in the ROD. Average contaminant concentrations above ROD-established cleanup standards implies that the area still needs remediation; therefore, the objective of the final certification sampling should be revised to demonstrate that the contaminant concentrations are below ROD-established cleanup standards.

Also, the phrase "reasonable confidence" in the referred text should be replaced with a quantitative confidence level such as 95 percent upper confidence level.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-2 Line #: 10 to 13
Original Specific Comment #: 119
Comment: The text presents the rates of carbonate and sulfuric leach processes as 20 and 1.7 tons per hour, respectively. The text should also provide the basis for selecting these rates.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-3 Line #: NA
Original Specific Comment #: 120
Comment: Figure L.2-1 shows that a portion of the filtrate from multimedia filtration of liquid from the dewatering operation is recycled to the carbonate leach process. The remaining filtrate goes to the advanced wastewater treatment (AWWT) plant. Because the role of recycled water in the carbonate leach process is not explained in the text and because the figure does not show that any solids are removed in the filtration process, it seems the arrows showing recycling of filtrate are probably erroneous. These arrows should show that solids removed during filtration are sent to the carbonate leach process for treatment. The figure should be reviewed and corrected if necessary.

The figure also shows that a portion of the liquid from precipitation/dewatering/recarbonation process is sent to the carbonate leach process. The rest of the liquid is filtrated. The arrows showing recycling of liquid to the carbonate leach process are probably erroneous. These arrows should indicate that solids removed by filtration are sent to the carbonate leach process. The figure should be reviewed and corrected if necessary.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-4 Line #: 23 to 26
Original Specific Comment #: 121
Comment: The text states that washing and screening is adequate for decontaminating soil particles greater than 0.157 inch in diameter. The text does not support this statement with a test result or with a reference to a study that can support the statement. The text should provide information to support the statement.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-5 Line #: NA
Original Specific Comment #: 122
Comment: Figure L.2-2 shows a table that presents data on the various streams shown in the figure. This table does not

present any information about the mass flow rate for Stream No. 3 or where oversized solids will go. In addition, the figure does not indicate any impact of Stream No. 3 on Streams No. 4 and No. 5. Mass flow rates for Stream No. 3 will probably vary with time, resulting in variable mass flow rates for Streams No. 4 and No. 5. The information in the referred table should be corrected to address these issues.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-7 Line #: 25 and 26
Original Specific Comment #: 123
Comment: The text states that the residence time of 1.25 hours in the reactor scrubber is sufficient for all reactions to occur. The text should provide or refer to information such as a treatability study to support this statement.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-8 Line #: NA
Original Specific Comment #: 124
Comment: Figure L.2-4 shows that filtrate from the second zone of the belt filter press (Stream No. 46) is recycled to aid in washing the filter cake. The figure and the associated text on Page 9 of Section L.2 do not clarify how the filter cake will be washed in the beginning of the process when no filtrate will be present in Filtrate Tank 2. Also, it is not clear what will happen to the filtrate after it becomes saturated with contaminants and may not aid in washing the filter cake. The text should be revised to clarify these issues.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-9 Line #: 20
Original Specific Comment #: 125
Comment: The text indicates that the precipitation process uses a series of two precipitation tanks. Figure L.2-5 shows a series of three precipitation tanks. The text and the figure should be reviewed and corrected to present the actual number of precipitation tanks used.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-9 Line #: 21 and 22
Original Specific Comment #: 126
Comment: The text states that the residence time of 4.5 hours in precipitation tanks allows sufficient time for all reactions to occur. The text should provide or refer to information such as a treatability study to support this statement.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-9 Line #: 24 and 25
Original Specific Comment #: 127
Comment: The text states that the overflow from the precipitate thickener is sent to a sump and then pumped to the second wastewater holding tank. Figure L.2-5 does not show the sump referred to in the text. The figure and the text should be reviewed and revised consistently to describe the actual process and equipment.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-16 Line #: 12 to 23
Original Specific Comment #: 128
Comment: The text states that the contents of about 1 in 10 containers will be randomly sampled and analyzed. Containers whose contents meet the WAC will be sent to the clean container storage area, and their contents will ultimately be backfilled on site. Because WACs and PRLs are different and because only soil meeting PRLs can be backfilled on site, the text seems to confuse PRLs with WACs. The text should be corrected to clarify this issue.

The text also states that containers whose contents do not meet PRLs will be sent to the contaminated soil storage pad. The text, however, does not indicate what will happen to containers whose contents are not sampled. The text should be revised to clearly indicate the fate of unsampled containers.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-17 Line #: NA
Original Specific Comment #: 129
Comment: Figure L.2-9 contains many discrepancies that should be resolved. Figure L.2-9 refers to Note 3 which is not provided. The PFD presented in the figure shows Streams No. 6 and 8, but information for only one of these streams is presented in the table accompanying the PFD. Also, because of poor readability of the table, it is not clear if the information in the table refers to Stream No. 6 or 8. The figure shows dashed lines surrounding some processes, but the significance of these lines is not explained. The legend also shows that the same line type is used to represent main and secondary process lines, making it impossible to distinguish them. Figure L.2-9 should be revised to correct these problems.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-18 Line #: NA
Original Specific Comment #: 130
Comment: Figure L.2-10 shows dashed lines surrounding some processes, but the significance of these lines is not explained. The legend also uses the same line type to

represent main and secondary process lines, making it impossible to distinguish them. Figure L.2-10 should be revised to correct these problems.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.2 Page #: L-2-19 Line #: 15
Original Specific Comment #: 131
Comment: The text discusses the decontamination and demolition of soil washing facilities but does not discuss their disposal. The text should be revised to specify the options for disposing of demolished soil washing facilities.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.5 Page #: L-5-1 Line #: 29 and 30
Original Specific Comment #: 132
Comment: The phrase "excess soil for consolidation with an earthen cover would be constructed" is unclear. The text should be revised to clarify its meaning.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.5 Page #: L-5-2 Line #: 23
Original Specific Comment #: 133
Comment: The text refers to a performance review for the consolidation area but does not present the criteria that will be used to review its performance. The text should present the performance review criteria for the consolidation area.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.5 Page #: L-5-6 Line #: 19
Original Specific Comment #: 134
Comment: The text states that the earthen cover will consist of a minimum of 1 foot of compacted clean soil. The text should present the criteria used to determine that the 1-foot thickness will provide adequate protection. Generally, leakage estimated using the U.S. EPA's Hydrologic Evaluation of Landfill Performance (HELP) model is used to evaluate the adequacy of soil thickness. A HELP model simulation result for the 1-foot thick compacted soil layer should therefore be presented.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.6 Page #: L-6-5 Line #: NA
Original Specific Comment #: 135
Comment: Figure L.6-2 shows details of the composite cap and liner. In the section showing the cap, the 12-inch-thick pea gravel layer and the geotextile separating it from the cobble layer can be removed because the drainage provided by the pea gravel layer can also be provided by the cobble layer without affecting the cobble layer's function as a biotic barrier. Also, DOE should consider providing a geocomposite layer consisting of a geotextile fabric, a

geonet, and a geomembrane under the compacted clay layer to reduce infiltration of any leakage through the clay layer to waste in the cell. Reduced infiltration will reduce the probability of groundwater contamination from cell leakage. In addition, the title of the section showing the cap should be corrected to read "composite cap" instead of "composite gap."

Finally, the size of perforated pipes in the leachate collection and leak detection layers should be increased to facilitate inspection using a video camera and cleaning of these pipes in the future. Increased pipe size will also require greater thickness of the gravel layers containing these pipes.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.6 Page #: L-6-7 Line #: 4, 11, and 12
Original Specific Comment #: 136
Comment: The text states that the pipes in the leachate collection and leak detection layers will be plugged and removed from service when the AWWT is removed from service. Leachate may keep building up within the cell and may leak from the bottom and sides of the cell if these pipes are not available for removal of leachate from the cell. The text should be revised to address this issue.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: L.6 Page #: L-6-11 Line #: 28 and 29
Original Specific Comment #: 137
Comment: The text states that leachate collected from the cell will be removed by pipes to the AWWT for treatment until the AWWT is removed from service. The text does not clarify the fate of leachate after removal of the AWWT from service. Because leachate generation in the cell will not cease after removal of the AWWT, the text should specify what will happen to the leachate after the removal of the AWWT from service.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: January 30, 1995

SUBJECT: Review of the Draft Feasibility Study Report For Operable Unit 5, Fernald Environmental Management Project (FEMP), Fernald, OH, November 1995

FROM: Pat Van Leeuwen, Toxicologist
Technical Support Unit

TO: Jim Saric
Project Manager

I have reviewed the Draft Feasibility Study Report for Operable Unit 5 of the Fernald Environmental Management Project (FEMP). Overall, it is well written and well organized. Because of the complexity of the document, I am not certain I have reviewed everything to the point of being completely comfortable with all the calculations and discussions presented here. I think we still have some statistical issues from the OU 2 and OU 5 risk assessments which may impact the final cleanup values. The CRARE calculations for the inorganics should be corrected, and the data used for the Monte Carlo analysis in the Uncertainty section requires more discussion. Most of my other comments address minor issues.

If you have any questions on these comments or any risk assessment issues, please contact me at 886-4904.

1) Tables ES-15/ES-16
Why is the cost given in different units in the different alternatives?

2) P. 1-38, lines 27-28
What is meant by "significant" contamination? What are the concentrations in these areas? Check this entire section for consistency of reporting.

3) P. 1-38, line 32
Ditto.

4) P. 1-39, 3rd para.
What happened to the lead detections? The RI identified areas with lead levels greater than 400 ppm lead in soil.

5) P. 1-43, lines 29/30

Explain why detections of radionuclides and inorganics outside the maximum extent of uranium contamination are more likely to be due to errors or other activities? If analytical errors or cross-contamination are suspected, samples should be reanalyzed. Detections of radionuclides at concentrations above background are most likely due to the site, unless a better source can be shown. The text should be purged of unsubstantiated comments of this sort.

6) P. 2-47, Figure 2-3

What happened to the gamma radiation exposure in this example? Should it be included in the "consideration" box for the Risk-based PRG?

7) P. 6-6, 1st bullet

What does this mean - if a lower residual risk is selected, there is no need to cleanup off-property land? I thought that some of this land included property that was used as cropland. If so, the opportunity for exposure is great. What restrictions can be placed on off-property areas, to restrict residential or farmland as uses? Can we/should we leave off-property areas with this level of contamination? This bullet opens the door for lots of discussion.

8) P. C-4-7, lines 1-2

Actually, EPA (1989a) indicates that 0.05 is a reasonable default in the absence of appropriate information. For many metals, GI absorption values can be derived from the literature.

9) P. C-4-8, 2nd para.

The approach for PAHs is the Relative Potency Factor (RPF) approach, not the TEF approach. An earlier approach used for PAHs was termed the TEF approach, but I do not believe that is what is referred to here.

10) P. C-4-10, last para.

It is interesting that FERMCO believes that the arsenic oral risk value is less uncertain than for most carcinogens. Most contractors believe that the value is very uncertain. ECAO presently stands behind using the values stated, without modification.

11) P. C-4-11/12

I'm not certain that I follow the magnesium discussion regarding Phillips Milk of Magnesia. The therapeutic treatment is limited, as described in the dosing, to 2 weeks. The RfD is calculated as a chronic exposure - more than 7 years by EPA definition. The 2 week exposure mat not result in any adverse exposure, while the 7 year exposure may have significant impact. The discussion should be revised to address the issue of a chronic exposure versus a very short term exposure.

12) Section H: the CRARE

As we have discussed numerous times, the source terms used to calculate CRARE residual risks MUST include background levels of both inorganic and organic COCs; ONLY radionuclide COC are exempt from this direction. All calculation and discussions of inorganic risks in this section are bogus and should be revised.

We have already advised FERMCO that Figures H.6-1 and 2 should be revised. Background levels may be shown in the figures for comparison, but any presentation of risks to the public must include background risks unless FERMCO knows of some way to selectively eliminate the background portion of the exposure.

13) Section H-VI Quantitative Uncertainty Analysis

a) The reference for the Exposure Factors Handbook (AIHC 1994) is missing. Explain why this document was chosen as the source of parameter distribution data for this analysis.

b) Exposure Duration: The analysis does not indicate that the values used in the risk assessment were based on the practice in the area surrounding Fernald (70 years), not the national average (30 years). More specific data, especially distribution data to use in Monte Carlo (MC) analysis, is seldom available for local areas. The discussion does not explain that the MC analysis done here substitutes the Israeli and Nelson (1992) data for more site-specific considerations. Please explain in the text why these data are more appropriate than local realty industry data and what is to be gained by applying this data to the Fernald area.

c) Body Weight: If body weight is a sensitive parameter, shouldn't male and female exposure be examined separately in an uncertainty analysis? The average female probably weighs much less than adult 72 kg mean. Women do farm. The uncertainty in the risk analysis is not addressed by doing a combined adult calculation. It is obvious from the sensitivity analysis that the risk calculation, as performed in the RI, is not conservative for women.

d) Ingestion Rate: The text states that the zirconium data was used to prepare the simulated distribution because this is the "most reliable tracer". That is a hotly debated issue that does not lend itself to such a statement of fact. All that is universally agreed upon is that the zirconium data gives the lowest of several estimates of ingestion rate; this is not explained in the text. A more appropriate uncertainty analysis would look at the risk using the distribution about the data used in the RI assessment.

e) Section H.VI.5.1 Impact: The discussion does not indicate that rather than examine the distribution (and uncertainty) about the data used in the RI to make the point estimates, this uncertainty analysis used DIFFERENT DATA BASES to select different means and ranges of values for a MC analysis. The analysis is

really an analysis of outcome using alternate sources of parameter values. A more meaningful MC analysis would have examined the risk range using the SAME DATA BASES as used in the RI risk calculations, not different ones. Overall, the uncertainty section purports to be a more indepth analysis of the point estimates, but it is really more an evaluation of alternate data inputs. This should be thoroughly explained in this section.